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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/535,547

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Koichi Kita

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EXAMINER

BUI, DUNG H

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/535,547	Applicant(s) KITA ET AL.	
	Examiner DUNG BUI	Art Unit 4153	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 May 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 February 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>5/18/05, 11/04/05</u> . | 6) <input type="checkbox"/> Other: _____ |

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DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. Claims 1-4 and 7-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lorimer (US 5,895,519).

Regarding claim 1, Lorimer discloses the claimed invention for a hydrogen permeable membrane (abstract) comprising a non-crystalline zirconium-nickel alloy composed of zirconium and aluminum: wherein the balance being nickel and unavoidable impurities (column 6, lines 12-18).

Also regarding claim 1, Lorimer does not disclose a hydrogen permeable membrane comprising a non-crystalline zirconium-nickel alloy composed of 44 to 75 atom % of zirconium and 0.2 to 16 atom % of aluminum: wherein the balance being nickel and unavoidable impurities. It would have been obvious to one having ordinary

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skill in the art at the time the invention was made to have a hydrogen permeable membrane comprising a non-crystalline zirconium-nickel alloy composed of 44 to 75 atom % of zirconium and 0.2 to 16 atom % of aluminum: wherein the balance being nickel and unavoidable impurities in order to optimize process, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Regarding claim 2, Lorimer discloses all of limitations as set forth above. Lorimer disclose the claimed invention except for wherein the nickel content is less than or equal to 43 atom %. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the nickel content is less than or equal to 43 atom % in order to increase the membrane efficiency, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Regarding claim 3, Lorimer disclose the claimed invention for a hydrogen permeable membrane comprising a non-crystalline zirconium-nickel alloy composed of zirconium; and of at least one of vanadium and niobium; wherein the balance being nickel and unavoidable impurities (column 6, lines 12-18).

Also regarding claim 3, Lorimer does not disclose a hydrogen permeable membrane comprising a non-crystalline zirconium-nickel alloy composed of 44 to 75 atom % of zirconium; and 0.2 to 12 atom % of at least one of vanadium and niobium;

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wherein the balance being nickel and unavoidable impurities. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have a hydrogen permeable membrane comprising a non-crystalline zirconium-nickel alloy composed of 44 to 75 atom % of zirconium; and 0.2 to 12 atom % of at least one of vanadium and niobium; wherein the balance being nickel and unavoidable impurities in order to optimize hydrogen permeable membrane, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Regarding claim 4, Lorimer discloses all of limitations as set forth above. Lorimer disclose the claimed invention except for wherein the nickel content is than or equal to 43 atom %. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the nickel content is less than or equal to 43 atom % in order to increase the membrane efficiency, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Regarding claim 7, Lorimer discloses the claimed invention for a hydrogen permeable membrane (abstract) comprising a non-crystalline nickel- zirconium alloy composed of: nickel and aluminum (column 6, lines 12-18).

Also regarding claim 7, Lorimer does not disclose a hydrogen permeable membrane comprising a non-crystalline nickel- zirconium alloy composed of: 44 to 75 atom % of nickel; and 0.2 to 16 atom % of aluminum; wherein the balance being

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zirconium and unavoidable impurities. It would have been obvious to one ordinary skill in the art at the time the invention was made to have a hydrogen permeable membrane comprising a non-crystalline nickel- zirconium alloy composed of: 44 to 75 atom % of nickel; and 0.2 to 16 atom % of aluminum; wherein the balance being zirconium and unavoidable impurities in order to optimize hydrogen membrane, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Regarding claim 8, Lorimer discloses the claimed invention except for a hydrogen permeable membrane comprising a non-crystalline nickel- zirconium alloy (abstract) composed of: nickel and at least one of vanadium and niobium (column 3, lines 33-37).

Also regarding claim 8, Lorimer does not disclose a hydrogen permeable membrane comprising a non-crystalline nickel- zirconium alloy composed of: 44 to 75 atom % of nickel; and 0.2 to 12 atom % of at least one of vanadium and niobium, wherein the balance being zirconium and unavoidable impurities. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have a hydrogen permeable membrane comprising a non-crystalline nickel- zirconium alloy composed of: 44 to 75 atom % of nickel; and 0.2 to 12 atom % of at least one of vanadium and niobium, wherein the balance being zirconium and unavoidable impurities in order to optimize hydrogen membrane purifying process, since it has been held that where the general conditions of a claim are disclosed in the prior art,

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discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

4. Claims 5, 6, and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lorimer (US 5,895,519) in view of Hara et al (US 6,478,853).

Regarding claim 5, Lorimer discloses the claimed invention for a hydrogen permeable membrane (Lorimer - abstract) comprising a non-crystalline zirconium-nickel alloy composed of zirconium and niobium (Lorimer – column 6, lines 12-18).

Also regarding claim 5, Lorimer does not disclose a hydrogen permeable membrane comprising a non-crystalline zirconium-nickel alloy composed of zirconium, niobium, and phosphorus. Hara et al teaches that it is known to have a hydrogen permeable membrane comprising a non-crystalline zirconium-nickel alloy composed of zirconium, niobium, and phosphorus (Hara et al – column 4, lines 16-25). Lorimer and Hara et al are analogous because both references are directed to purifying hydrogen gas. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have a hydrogen permeable membrane comprising a non-crystalline zirconium-nickel alloy composed of zirconium, niobium, and phosphorus as taught by Hara et al in order to prepare the non-crystalline alloy easily.

Also regarding claim 5, Lorimer as modified discloses the claimed invention except for a hydrogen permeable membrane comprising a non-crystalline zirconium-nickel alloy composed of 44 to 75 atom % of zirconium; 0.2 to 12 atom % of niobium; and 0.1 to 10 atom % of phosphorus, provided wherein the combined amount of niobium and phosphorus is not less than or equal to 18 atom %, with the balance being

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nickel and unavoidable impurities. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have a hydrogen permeable membrane comprising a non-crystalline zirconium-nickel alloy composed of 44 to 75 atom % of zirconium; 0.2 to 12 atom % of niobium; and 0.1 to 10 atom % of phosphorus, provided wherein the combined amount of niobium and phosphorus is not less than or equal to 18 atom %, with the balance being nickel and unavoidable impurities in order to optimize hydrogen membrane, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Regarding claim 6, Lorimer as modified discloses the claimed invention except for wherein the nickel content is less than or equal to 43 atom %. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the nickel content is less than or equal to 43 atom % in order to increase the membrane efficiency, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Regarding claim 9, Lorimer discloses the claimed invention for a hydrogen permeable membrane comprising a non-crystalline nickel- zirconium alloy composed of: nickel, niobium, and phosphorus. Hara et al teaches that it is known to have a hydrogen permeable membrane comprising a non-crystalline nickel- zirconium alloy composed of: nickel, niobium, and phosphorus (Hara et al – column 4, lines 16-25). It

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would have been obvious to one having ordinary skill in the art at the time the invention was made to have a hydrogen permeable membrane comprising a non-crystalline nickel- zirconium alloy composed of: nickel, niobium, and phosphorus as taught by Hara et al in order to prepare the non-crystalline alloy easily.

Also regarding to claim 9, Lorimer as modified discloses the claimed invention except for a hydrogen permeable membrane comprising a non-crystalline nickel- zirconium alloy composed of: 44 to 75 atom % of nickel; 0.2 to 12 atom % of niobium; and 0.1 to 10 atom % of phosphorus; wherein the combined amount of niobium and phosphorus is not more than 18 atom %, wherein the balance being zirconium and unavoidable impurities. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have for a hydrogen permeable membrane comprising a non-crystalline nickel- zirconium alloy composed of: 44 to 75 atom % of nickel; 0.2 to 12 atom % of niobium; and 0.1 to 10 atom % of phosphorus; wherein the combined amount of niobium and phosphorus is not more than 18 atom %, wherein the balance being zirconium and unavoidable impurities in order to optimize hydrogen membrane, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

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US 20020159354, US 20030159354, US 20030183080, US 20030205138, US 20040101740, and US 20040229090.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DUNG BUI whose telephone number is (571)270-7077. The examiner can normally be reached on Mon. - Thurs., 7:30 a.m.-5 p.m., EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Basia Ridley can be reached on (571)272-1453. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Tony G Soohoo/
Primary Examiner, Art Unit 1797
AU 4153 TA

DB